Society Reports.

THE BROOKLYN SOCIETY FOR NEUROLOGY.

Meeting held November 9, 1892.

BRAIN-CYSTS CONNECTING WITH A VENTRICLE.—THREE REPORTS.

I.—A Case of Traumatic Cephalhydrocele, with Remarks on the Causation of Hydrocephalus. By William Browning, M.D.

II.—An Operated Case of Brain-Cyst connecting with the Lateral Ventricle—Autopsy. By Calvin F. Barber, M.D.

III.—The Identification of Cerebro-spinal Fluid. By Elias H. Bartley, M.D.

I.

The comparative rarity of this trouble, at least of published reports, and some interesting questions involved, suggest that the subject may be worth considering, even though little new can be added.

My case is that of a girl of seven years, seen in October, 1892, a patient of Dr. Geo. E. Graw. Her trouble dates from an injury when a year old. The mother, with the child in her arms, fell on the stairs, throwing the girl somewhat violently into a corner. This was immediately followed by convulsions and by left hemiplegia not involving the face. There was no previous paralysis or other abnormity. The physician then in attendance said that the soft cranium had been dented in. At first the head was greatly swollen, and for years a large lump remained over the region of injury. This, however, gradually subsided; so that for the last three years it only puffs out on crying.

A year ago last summer she was in convulsions all one night; and she had another seizure October 7th, this year. She has, however, also been having of late so-called fainting-spells two or three times a day, and has been less bright mentally since the first convulsions. The latter are severer on the left side; no initial symptom, but a moan; always of late yawning and tired; never complains of headache, unless sometimes of local tenderness on the head from crying; the left hemiplegia has very gradually improved, so that only a paresis remains; shortening of left extremities stated; knee and radial jerks stronger on left than on right; left hand cooler than right. For years the left thumb and fingers were drawn in and the hand was a little flexed; but even then, although not possible when awake, yet in sleep the arm would be freely put up over the head (*i. e.*, mimic or so-called automatic actions intact—a thalamic function). Walks limpingly on left leg; can just about stand alone on left foot.

Pupils equal; no distinct hippus. Vision in left eye possibly impaired, yet fairly good; in right, normal. Pulse 108 (standing). Sleeps well and without special dreaming. Is a plump, healthy, and bright-looking child. Cannot read yet, but can count some. Has a lively interest in everything, is properly inquisitive, laughs, plays, etc.

There is a long, somewhat transverse depression in the skull, reaching slightly backward to the left of the median line, and crossing the sagittal suture an inch or so in front of the lambdoid. The main part runs from this point obliquely forward and somewhat downward over the upper parietal region on the right. The hair-growth and color of skin over this part are normal. When the child is mentally excited, there is a filling up of the depression, that, however, can be very easily forced back by pressure with the finger-tips. It also fills some on compressing the jugulars. No distinct opening can, however, be felt, though it is evidently at the bottom of the hollow. When she lies down the whole depression fills up, even a trifle more than level, yet is also very easily emptied, showing a pretty free communication with the encranium.

Pulsation did not seem noticeable when the cyst filled by lowering the head, but became very evident when in erect postures it filled by any mental effort; *i. e.*, there was decided pulsation only when the fluid was driven up by an actively increased arterial supply to the brain. Perhaps this is the explanation of the fact that, in some cases, pulsation is observed, and in others not, although the size of the communication must also be a factor—a minute opening diminishing the pulsatory movement.

We aspirated and removed about two drachms of a clear, colorless fluid like water, excepting for some minute floating particles or threads. The puncture, though through a firm cyst-wall, did not appear to cause any pain, nor did the withdrawal of this small quantity of fluid have any perceptible effect on the patient. The cavity was immediately refilled, and even leaked some through the oblique puncture while she remained reclining, thus showing an abundant source. Microscopical examination of the aspirated fluid showed: occasionally a leucocyte; rare, irregular flakes and fibres, sometimes a little pigmented, otherwise only uncertain; and foreign matters.

Though the total of experience with this form of trouble is limited, it suffices to indicate that the cyst in this case connects with the lateral ventricle, and that the fluid is cerebro-spinal. Further and decisive proof was given by the chemical examination. This was made by Dr. Bartley, and, as it involves recent methods not (so far as I am aware) ever applied to one of these cases, I have asked him to contribute a brief account of the main decisive tests.

His results in this case were as follows:

Specific gravity (by weight), 1010.
No precipitation by heat.
All proteids precipitated by magnesium sulphate.
A precipitation by cold nitric acid.
No precipitation by hot nitric acid.
With Fehling's solution doubtful.

This excludes serum-albumen, but includes albumose, and in general shows that the fluid corresponds well to cerebro-spinal, but not to that from any independent cyst.

The differential diagnosis in well-marked cases is almost alone from venous cysts (*vide* Martin, "Venous Blood Tumors of the Cranium," "Journal Am. Medical Association," 1886, September 18th, 25th, and October 2d). Hernia cerebri, encephalocele, etc., are often congenital, and not readily reducible. Aspiration (and, if necessary, an examination of the fluid) settles the diagnosis.

It has been noted that all cases are in the young. It is not probable that they all die before advancing far in years, but that, as in Southam's case, either the external part shrinks up or the cranial opening becomes shut off spontaneously or by the natural bone-growth, thus leaving simply an encranial cyst (ventricular diverticle). Evidently of this nature aremany of the cases of late glibly dubbed porencephalus: as that of Dr. Barber (given in this number), that of Brush, and others. This makes the pathology somewhat comparable to that in cases of syringomyelia starting from the central canal.

As to treatment: One negative indication has been established, both by theory and experience. Do not attempt surgical interference. The cases so far operated appear all to have ended fatally. Tapping also proves of little use, except when necessary to relieve pressure.

The literature of the subject is not great, the principal English and American papers being:

C. Lucas: Two cases. Guy's Hospital Reports, 1876, 1880–81.

Connor: Am. Journal Med. Sciences, 1884, July. He collected 22 cases, including 2 of his own.

Southam: Brit. Med. Journal, 1888, May 12th.

Makins: Trans. Clin. Society, London, 1888–89, xxii.

My recollection also includes a misplaced society report, probably American.

A few considerations may be added as to the way in which such cysts (or diverticles of the ventricle) originate. It is at least improbable that a simple rupture of the ventricular wall (ependyma) could alone lead to this result, although it doubtless occurs as a preliminary factor. The case is practically a special form of internal hydrocehpalus. There is no evidence to show that this is here kept up by any continuous inflammation of the secreting choroidal villi. There seem to be two possible ways left, involving an interference with either: (*a*) the ventricular venous efferents, or (*b*) the normal discharge of the ventricular fluid. It is commonly assumed that the hydrocephalus observed from cerebellar and other tumors so situated as to exert pressure on the vein of Galen is due to venous stasis, and the consequently increased production of ventricular fluid; and there is other corroborative evidence. In the acute form due to tubercular meningitis, it is customary to explain the accumulation of fluid in the cœle as due to inflammatory irritation; *i. e.*, oversecretion. In one such case, however, I found a tubercular mass the size of a large pea just between Galen's vein and the cerebellum, attached to and pressing on both. This, in fact, was the only tubercle of any size, and the not very extensive amount of fluid may well have been of obstructive rather than of irritative origin.

I also once published a case of moderate internal hydrocephalus due to an almost complete blocking of the straight sinus (JOURNAL NERV. AND MENT. DISEASE, 1887, April); and in another connection I have even tried to show that the strictly ventricular veins were terminal vessels. But Hedou, a later French investigator, claims that these veins do have more or less connection, through their finer branches in the brain-substance, with those discharging in other directions at the brain-surface. Even, however, granting his results, it is not demonstrated that such anastomoses are adequate when the normal venous path is obstructed; for closure of Galen's vein is certainly and rapidly fatal.

The alternative explanation of an interference with the normal efferents for the ventricular fluid is involved in even greater obscurity. That such fluid may flow through the acqueduct of Sylvius into the fourth ventricle, and then perhaps through lateral openings, was practically shown by an autopsy on a man in middle life, who died from a hemorrhage starting in a spot of softening and breaking into the left post-cornu. The blood filled the left lateral, passed through the foramen of Monro to some extent into the right, but principally by way of the third ventricle and the aqueduct into the fourth. From this it oozed out on either side subarachnoidal. The existence of such lateral openings to the fourth ventricle and of a posterior outlet has been denied. But such cases of hemorrhage, not very rare in any pathologist's experience, seem to give conclusive proof to the contrary, and show that these may represent a natural outlet for the ventricular fluid. That tapping a spina befida may relieve a hydrocephalus connected with it is well known. The occurrence of ciliated epithelium in the walls of the aqueduct might corroborate this if we knew more definitely the direction of their action.

As to possible ventricular relief through lymphatics, little definite can be said. Ependymal stomata have been described, and the lymphatics of the choroid plexus in the lateral ventricle unite, according to Arnold, to one trunk, following Galen's vein. Hence the main outlets, both for the venous blood and for the ventricular fluid, whether by the aqueduct or by lymphatics, all run for a short distance close together. Consequently, any compression of the one would in most cases be accompanied by interference with the others, and it becomes difficult, in given cases, to distinguish which is the principal.

In at least many of these cephalhydrocele cases the connection with the ventricle is at a point in the region of what may be termed the ventricular outlet, or neck of the cœle (in ours, evidently the roof over this part). A slight dragging, displacement, cicatricial constriction, or even fibrinous plugging at this point, might suffice. Until some more exact explanation can be given, I think we may contentedly conclude that obstruction at this outlet is the cause. The same holds also for quite a proportion of the miscellaneous cases of hydrocephalus. Surgical measures, by any plan so far proposed, must prove unavailing in all such cases, largely by reason that the real cause is not removed, and the like applies to all attempts at cure by tapping.

II.

For the minutes of the case under consideration I am indebted to Dr. Jessie Duryea, now superintendent of the Kings County Hospital, under whose care the patient was, both before and after the operation.

A boy, T—— Mc——, fourteen years of age, was sent to the County Hospital from an institution for the care of orphan children.

His history up to the time of entering the hospital was exceedingly unsatisfactory. His parents were ignorant, and, as far as investigation could show, there existed no neurotic taint in the family.

When about eighteen months of age he fell from a second-story window, receiving a severe injury to his head. Several weeks passed before he had fully recovered. At this time, for some reason not explained, an operation was advised by the attending physician, the parents refusing to have it performed.

The patient had been an inmate of an orphan asylum for about four years previous to his admission into the hospital. While in the asylum he was the subject of epileptic seizures of varying degrees of severity. Upon his admission to the hospital he was found to be well nourished, but suffering from left hemiparesis. Had a marked depression in the temporo-occipital region of right side; the depression was triangular, with the base looking forward. Base was half an inch posterior to and parallel with a line drawn over top of head from one auditory meatus to the other. The lower side of the triangle corresponded with a line drawn from the external occipital protuberance to the upper margin of the orbit. The sides of the aperture measured one and one-fourth and one and one-half inches respectively.

While under observation the patient averaged one convulsion in three days, some occurring at night. Just before a seizure he would use profane language regardless of those about him. The convulsive seizure over, the patient would seize anything within his reach and hurl the missile at those about him. These features were characteristic at each seizure.

Drs. I. H. Barber and John C. Shaw carefully examined the boy, and advised an operation: all other treatments having failed, and as the depression in the skull could only be explored by the use of the knife; there seemed to be a fair chance of relieving the symptoms by the removal, perchance, of a depressed piece of bone.

December 12, 1889, full consent having been obtained, the patient was anæsthetized, and in the presence of Drs. Schenck, Browning, Wells, Arnold, McComber, Osgood, and house staff. Dr. I. H. Barber operated.

The usual scalp incision was made, exposing the depression and revealing the absence of bone where depression had existed. The membranes being incised, an opening appeared, through which a probe was inserted into what appeared to be a large cyst of right hemisphere. As there was free pulsating discharge of clear fluid from the cyst, a drainage-tube was inserted, the wound closed antiseptically, and the child put to bed.

The wound healed by first intention, save at point of drainage.

Within forty-eight hours after the operation the patient had three convulsive seizures, after which he had no return of the attacks.

The cavity was washed daily with warm water (no reaction), and the wound dressed. At each dressing the discharge was profuse and of a clear, serous character.

Highest temperature registered was $101\frac{2}{5}$°; on the fifth day after operation.

For the first three days following the operation the boy was very stupid, sleeping the greater part of the time. Frontal headache seemed to be his only complaint. Appetite good.

On the eleventh and twelfth days the patient tore the dressings from his head, complaining of an itching sensation; and on the thirteenth day the wound did not drain freely; there was rigidity of the muscles of whole body, and he did not respond to tests for sensation; he became speechless.

These symptoms were all relieved after removal of dressings and the discharge of about half an ounce of fluid.

On the fourteenth day after operation he became comatose, and died on the following morning.

Autopsy.—Removing the scalp, the section of bone surrounding the opening was found to be exceedingly thin, with irregular outline. The original fracture was found to have united by ligamentous union only. It extended, anteriorly, to within a short distance of coronal suture and about three-quarters of an inch posteriorly from opening.

The dura surrounding the opening was firmly attached to the bony wall.

Examination of brain-surface showed a vertical belt of disintegration about one-half inch in width, extending from the base upward, including the opening, to a point above the intra-parietal fissure. Incising the opening, a cavity appeared about the size of a large goose-egg, with a smooth limiting well. The surrounding brain-tissue was somewhat softened. The cyst-cavity had a well-defined though small opening into the lateral ventricle at about the juncture of posterior and lateral horns.

III.

The cerebro-spinal fluid differs from other serous fluids in chemical composition to such an extent that it may be differentiated from them by simple chemical tests. This fluid ought to be regarded as a true secretion rather than as an exudate.

The fluid, when pathologically increased in quantity, does not usually depart from the normal composition. After tapping a sac filled with cerebro-spinal fluid a number of times, there is apt to be some inflammatory exudate (or transudation), which partakes of the properties of other serous or inflammatory exudates. Cerebro-spinal fluid contains but traces of serum albumen, the proteids being usually in the form of albumoses.

There is usually present no fibrinogen; hence this fluid does not clot.

All the proteids are precipitable by saturating the solution with magnesium sulphate. Serum albumen is not precipitated by this salt, and hence must be absent.

Sometimes there is found a specimen which gives a small amount of serum albumen coagulum on boiling. The albumoses are precipitated by cold nitric acid, but the coagulum dissolves on warming, to reappear on cooling.

The specific gravity of cerebro-spinal fluid is generally lower than other serous fluids. It ranges from 1005 to 1010. The albumoses, like peptones, give the biuret reaction, or pink color, with Fehling's solution. Cerebrospinal fluid reduces Fehling's solution, owing to the presence of a substance believed to be pyrocatechin.

To apply these facts to the practical examination of a suspected fluid, we may proceed as follows:

1. Boil, when there should be not more than a trace of coagulum—serum globulin and serum albumen.
2. Cold nitric acid ought to form a precipitate, which disappears on heating, and separates again on cooling.
3. Saturation with magnesium sulphate should give a precipitate. Saturation with sodium chloride should also produce a precipitate. Ammonium sulphate may be tried if the above salts fail.
4. The solution floated upon Fehling's solution gives a pink zone at the line of contact.
5. When boiled with Fehling's solution, there is a reduction of the copper—pyrocatechin.
6. The specific gravity is between 1005 and 1010.

In repeated tappings the later ones give inflammatory products with serum albumen, together with the albumoses; *i. e.*, they coagulate with heat and nitric acid.

PHILADELPHIA NEUROLOGICAL SOCIETY.

Stated Meeting, November 28, 1892.

The President, Dr. FRANCIS X. DERCUM, in the chair.

Dr. WM. OSLER read a paper on

CHRONIC CHOREA.

(See page 129)

DISCUSSION.

Dr. CHARLES K. MILLS.—My attention has long been directed to the importance of finding the link which binds these cases of chronic chorea, not only to each other, but also to other well-known forms of organic and mobile disease, as Friedreich's ataxia, and various organic athetoid and choreic diseases of that kind. I should like to know more about the exact pathology of these cases, and I had hoped that the microscopical examination which Dr. Osler had made would have thrown some